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WHAT IS CLAIMED IS:

1. An isolated DNA molecule selected from the group consisting of:

A. the DNA sequence of FIGURE 1 (SEQ ID NO:1);

B. the DNA sequence of FIGURE 2 (SEQ ID NO:3);

C. the DNA sequence of FIGURE 20A (SEQ ID NO:22);

D. DNA sequences that hybridize to any of the foregoing DNA sequences under standard hybridization conditions;

E. DNA sequences that code on expression for an amino acid sequence encoded by any of the foregoing DNA sequences;

F. degenerate variants thereof;

G. alleles thereof; and

H. hybridizable fragments thereof.

2. An isolated nucleic acid molecule, which nucleic acid molecule encodes an ob polypeptide, which polypeptide is characterized by having about 145 to about 167 amino acid residues, being expressed predominantly by adipocytes, and being capable of inducing a reduction of body weight in an animal.

3. The isolated nucleic acid of Claim 2, wherein the ob polypeptide has an amino acid sequence selected from the group consisting of the sequence depicted in:

a) Figure 1 (SEQ ID NO:2),

b) Figure 1 from amino acid number 22 to amino acid number 167, Figure 3 (SEQ ID NO:4),

c) Figure 3 from amino acid number 22 to amino acid number 167,

d) Figure 5 (SEQ ID NO:5),

e) Figure 5 from amino acid number 22 to amino acid number 166,

f) Figure 6 (SEQ ID NO:6), and

g) Figure 6 from amino acid number 22 to amino acid number 166.

4. The nucleic acid molecule of Claim 2 selected from the group consisting of DNA and RNA.

5. The nucleic acid molecule of Claim 2, which has a sequence as shown in Figure 1 (SEQ ID NO:1) from nucleotide number 46 to nucleotide number 550.

6. The nucleic acid molecule of Claim 2, which has a sequence as shown in Figure 2 (SEQ ID NO:2) from nucleotide number 46 to nucleotide number 550.

7. The nucleic acid molecule of Claim 1 which is detectably labeled.

8. A vector, which comprises the DNA molecule of Claim 1.

9. An expression vector, which comprises the nucleic acid molecule of Claim 2, operatively associated with an expression control sequence.

10. A nucleic acid hybridizable to a non-coding region of an *ob* nucleic acid, which non-coding region is selected from the group consisting of an intron, a 5′ non-coding region, and a 3′ non-coding region.

11. A probe capable of screening for a nucleic acid encoding an ob polypeptide, which probe is a labeled DNA molecule of Claim 1.

12. A unicellular host transfected with a cloning vector of Claim 8.

13. A unicellular host transfected with an expression vector of Claim 9.

14. The unicellular host of Claim 13 wherein the unicellular host is selected from the group consisting of *E. coli*, *Pseudomonas*, *Bacillus*, *Streptomyces*, Pichia yeasts, CHO, R1.1, B-W, L-M, COS 1, COS 7, BSC1, BSC40, and BMT10 cells, plant cells, insect cells, and human cells in tissue culture.

15. An oligonucleotide primer for amplifying human genomic DNA encoding an ob polypeptide.

16. The oligonucleotide of Claim 15, which is selected from the group consisting of

HOB 1gF 5'-CCCAAGAAGCCCATCCTG-3' (SEQ ID NO:26)
HOB 1gR 5'-GACTATCTGGGTCCAGTGCC-3' (SEQ ID NO:27)
HOB 2gF 5'-CCACATGCTGAGCACTTGTT-3' (SEQ ID NO:28)
HOB 2gR 5'-CTTCAATCCTGGAGATACCTGG-3' (SEQ ID NO:29).

17. An ob polypeptide, which polypeptide is encoded by the DNA molecule of Claim 1.

18. An ob polypeptide, which polypeptide is characterized by having about 145 to about 167 amino acid residues, being expressed predominantly by adipocytes, and being capable of inducing a reduction of body weight in an animal.

19. The ob polypeptide of Claim 18 which has the amino acid sequence shown in Figure 1 (SEQ ID NO:2) or Figure 5 (SEQ ID NO:5).

20. The ob polypeptide of Claim 19 which has the amino acid sequence shown in Figure 3 (SEQ ID NO:4) or Figure 6 (SEQ ID NO:6).

21. An immunogenic fragment of an ob polypeptide, which polypeptide is characterized by having about 160 amino acid residues, being expressed predominantly by adipocytes, and being capable of inducing a reduction of body weight in an animal.

22. The immunogenic fragment of an ob polypeptide of Claim 21, which is selected from the group consisting of

Val-Pro-Ile-Gln-Lys-Val-Gln-Asp-Asp-Thr-Lys-Thr-Leu-Ile-Lys-Thr (SEQ ID NO:18);

Leu-His-Pro-Ile-Leu-Ser-Leu-Ser-Lys-Met-Asp-Gln-Thr-Leu-Ala (SEQ ID NO:19);

Ser-Lys-Ser-Cys-Ser-Leu-Pro-Gln-Thr-Ser-Gly-Leu-Gln-Lys-Pro-Glu-Ser-Leu-Asp (SEQ ID NO:20); and

Ser-Arg-Leu-Gln-Gly-Ser-Leu-Gln-Asp-Ile-Leu-Gln-Gln-Leu-Asp-Val-Ser-Pro-Glu-Cys (SEQ ID NO:21).

23. A derivative of a polypeptide according to claim 17 or 18 having one or more chemical moieties attached thereto.

24. The derivative of claim 15 wherein the chemical moiety is a water soluble polymer.

25. The derivative of claim 16 wherein the water soluble polymer is polyethylene glycol.

26. An analog of an ob polypeptide having the amino acid sequence of human ob depicted in Figure 4, which analog is selected from the group consisting of:

A. serine residue at position 53 substituted with glycine, alanine, valine, cysteine, methionine, or threonine;

B. serine residue at position 98 substituted with glycine, alanine, valine, cysteine, methionine, or threonine;

C. arginine residue at position number 92 substituted with asparagine, lysine, histidine, glutamine, glutamic acid, aspartic acid, serine, threonine, methionine, or cysteine;

D. one or more of residues 121 to 128 substituted with glycines or alanines;

E. deletion of one or more amino acid residues at positions 121-128;

F. a loop structure formed by the disulfide bond that forms between cysteine residues 117 and 167;

G. amino acids from residue 22 to 53;

H. amino acids from residue 61 to amino acid residue 116;

I. amino acids from residue 61 to amino acid residue 167;

J. aspartic acid at one or more of residues 29, 30, 44, 61, 76, 100, and 106 substituted with glutamic acid; and

K. one or more isoleucine residues substituted with leucine.

27. A method for preparing an ob polypeptide comprising:

A. culturing a unicellular host of Claim 12 or 13 under conditions that provide for expression of the ob polypeptide; and

B. recovering the expressed ob polypeptide.

28. The method according to Claim 27 wherein the host cell is a bacterium.

29. The method according to Claim 27, wherein the host cell is a yeast.

30. The method according to Claim 27, further comprising:

C. chromatographing the polypeptide on a Ni-chelation column; and

D. purifying the polypeptide by gel filtration.

31. The method according to Claim 30, further comprising after step C and before step D chromatographing the ob polypeptide on a strong cation exchanger column.

32. An antibody to the ob polypeptide of Claim 17.

33. An antibody to the ob polypeptide of Claim 18.

34. A method for preparing an antibody to an ob polypeptide, comprising:

A. conjugating the immunogenic fragment of an ob polypeptide of Claim 19 to a carrier protein;

B. immunizing a host animal with the ob polypeptide fragment-carrier protein conjugate of step A admixed with an adjuvant; and

C. obtaining antibody from the immunized host animal.

35. The antibody of Claim 32, 33, or 34 which is a polyclonal antibody.

36. The antibody of Claim 32, 33, or 34 which is a monoclonal antibody.

37. An immortal cell line that produces a monoclonal antibody according to Claim 36.

38. The antibody of Claim 32, 33, or 34 labeled with a detectable label.

39. A method for measuring the presence of an ob polypeptide in a sample, comprising:

A. contacting a sample suspected of containing an ob polypeptide with an antibody that binds to the ob polypeptide under conditions which allow for the formation of reaction complexes comprising the antibody and the ob polypeptide,

B. detecting the formation of reaction complexes comprising the antibody and ob polypeptide in the sample;

in which detection of the formation of reaction complexes indicates the presence of ob polypeptide in the sample.

40. The method of Claim 39 in which the antibody is bound to a solid phase support.

41. A method for evaluating the level of ob polypeptide in a biological sample comprising

A. detecting the formation of reaction complexes in a biological sample according to the method of Claim 30; and

B. evaluating the amount of reaction complexes formed, which amount of reaction complexes corresponds to the level of ob polypeptide in the biological sample.

42. A method for detecting or diagnosing the presence of a disease associated with elevated or decreased levels of ob polypeptide in a mammalian subject comprising:

A. evaluating the level of ob polypeptide in a biological sample from a mammalian subject according to Claim 41; and

B. comparing the level detected in step (A) to a level of ob polypeptide present in normals or in the subject at an earlier time;

in which an increase in the level of ob polypeptide as compared to normal levels indicates a disease associated with elevated levels of ob polypeptide, and decreased level of ob polypeptide as compared to normal levels indicates a disease associated with decreased levels of ob polypeptide.

43. A method for monitoring a therapeutic treatment of a disease associated with elevated or decreased levels of ob polypeptide in a mammalian subject comprising evaluating the levels of ob polypeptide in a series of biological samples obtained at different time points from a mammalian subject undergoing a therapeutic treatment for a disease associated with elevated or decreased levels of ob polypeptide according to the method of Claim 41.

44. A method for changing the body weight of a mammal comprising inhibiting the expression of an ob polypeptide encoded by a nucleic acid of Claim 2.

45. The method according to Claim 44 comprising expressing an antisense nucleic acid molecule hybridizable to a nucleic acid that expresses the ob polypeptide, expressing a ribozyme that cleaves a nucleic acid that expresses the ob polypeptide, administering an antisense nucleic acid molecule hybridizable to a

nucleic acid that expresses the ob polypeptide, and administering a ribozyme that cleaves a nucleic acid that expresses the ob polypeptide.

46. A pharmaceutical composition for reducing body weight of an animal comprising the ob polypeptide of Claim 17 and a pharmaceutically acceptable carrier.

47. A pharmaceutical composition for reducing body weight of an animal comprising the ob polypeptide of Claim 18 and a pharmaceutically acceptable carrier.

48. A method for reducing the body weight of an animal comprising administering an amount of a pharmaceutical composition of Claim 47 effective to reduce the body weight of an animal to an animal believed to be in need of decreased body weight.

49. The method according to Claim 48 wherein the animal is a human, and the ob polypeptide is human ob polypeptide.

50. A method for reducing the body weight of a mammal comprising increasing the expression of a protein encoded by the nucleic acid of Claim 2.

51. A pharmaceutical composition for increasing the body weight of an animal comprising an antagonist of an ob polypeptide.

52. The pharmaceutical composition of Claim 51, wherein the antagonist is selected from the group consisting of an antibody that binds to and neutralizes the activity of ob polypeptide, a fragment of the ob polypeptide that binds to but does not activate the ob receptor, and a small molecule antagonist of the ob polypeptide.

53. A method for increasing the body weight of an animal comprising administering an amount of the pharmaceutical composition of Claim 51 effective to cause an increase in body weight to an animal believed to be in need of increased body weight.